SILENT MYOCARDIAL ISCHEMIA IN PATIENTS WITH VASCULAR IMPOTENCE

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Vascular impotence (IMP) defined as a penile brachial pressure index (PBPI) of <0.65 is associated with a 26% probability of developing a major vascular event over 3 years compared to only 4.5% in those with PBPI'S >0.65 (Am. J. Med.84:445, 1986). Thus, we investigated whether the PBPI would predict an abnormal exercise stress test (EST) in IMP men with no symptoms of coronary artery disease. Of 49 patients studied (mean age 64.9), 27 had a PBPI <0.65, 10 had a PBPI of 0.65-0.75 and 12 had a PBP' of >0.75. EST was carried out using a Bruce protocol. Standard ECG criteria were used to describe the results. A dipyridamole thallium test was performed on those patients in whom EST was non-diagnostic. The results (see table) showed a significantly (p=0.036) increased likelihood of an abnormal stress test in men with an abnormal PBPI compared to a normal value.

	PBPI		
Stress Test	<0.65	0.65-0.75	>0.75
Positive (19)	14	4	1
Negative (30)	13	6	11

The three groups did not differ with respect to age, or levels of FSH, LH, prolactin or estradiol. Significantly (p=0.01) higher values of testosterone were observed in patients with positive stress tests. Conclusions: 1. In older IMP men silent myocardial ischemia occurs more frequently in those with an abnormal PBPI. 2. Measurement of PBPI in IMP may identify men at high risk of coronary artery disease.

CHRONIC STRENUOUS EXERCISE CAN ATTENUATE AGING EFFECTS ON MAXIMAL CARDIOVASCULAR FUNCTION.

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To determine whether the age-related decline in cardiovascular function is attenuated by long term strenuous exercise, 10 young (26±4 yrs; mean±SD) and 14 old (63±4 yrs) healthy sedentary men (YS and OS respectively) and 13 master athletes (MA, 64±4 yrs) were studied during maximal treadmill exercise. Maximal oxygen uptake ($\dot{V}O_2$max), cardiac output using acetylene rebreathing method, heart rate (HR) and blood pressure were determined and cardiac index (CI), stroke index (SI) and arterio-venous oxygen difference (AVO_2D) were calculated. The results are as follows:

	$\dot{V}O_2$max	CI	HR	SI	AVO_2D
	ml/kg/min	l/min/m^2	bpm	ml/m^2	ml/100ml
YS	48.5±3.4	11.4±1.2	193±9	62±8	15.3±1.3
OS	26.8±4.7*	8.2±1.1*	171±13*	49±7*	13.4±1.4*
MA	46.0±4.4+	11.0±1.1+	170±9*	66±8+	14.8±1.5+

*p<0.05 vs YS, +p<0.05 vs YS.

Thus, maximal cardiovascular function declines with age and the age-related decrease in $\dot{V}O_2$max is mediated by decline in maximal HR, SI and AVO_2D (-11, -20 and -12% respectively). Data suggest that regular, long term, strenuous exercise can attenuate the age-related decline in SI and AVO_2D at maximal effort but may not prevent decrease in maximal HR.

AGE-RELATED CHANGES IN CARDIAC FUNCTION BY COLOR DOPPLER ECHOCARDIOGRAPHY.

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To identify changes in cardiac function due to aging, we performed color Doppler echocardiography in three groups (grps) of healthy donors at a regional blood bank. Grp I was aged 20-25 (n=20), Grp II aged 40-45 (n=20), and Grp III aged 63-77 (n=155). All were screened and excluded if disease was detected by history, physical exam, ECG, urinalysis, and blood tests including glycosylated hemoglobin. LV and LA volumes were by Simpson's rule, LV mass by truncated ellipse model, and PA systolic pressure (PAsp) from tricuspid insufficiency (TI) velocity and vena cava dynamics.

There were no significant differences among groups I-III in LV volume indices, LA volume, LV mass index or ejection fraction (EF). 6% of grp III had regional wall motion abnormalities. Data for insufficiency of aortic (AI) and mitral (MI) valves, TI, PAsp and mean mitral peak E/A velocity ratio (E/A) are:

Group	N	AI	MI	TI*	PAsp(mmHg)	E/A
III	155	37**	103**	77**	29.5+	.88**
II	20	1	11	6	27.4	1.53
I	20	1	5	2	24.7	1.73

*more than trivial; **p<.01 vs grps I & II; +p<.05 vs grp I

In summary, compared to younger people, the healthy elderly have an increased frequency of valvular insufficiency, higher pulmonary artery pressure, and lower E/A ratios, but do not have different LV volumes, mass or EF.

NORMAL AGING IS ACCOMPANIED BY REDUCED EARLY DIASTOLIC FILLING INDEPENDENT OF LV MASS, HEART RATE, CONTRACTILITY AND LOADING CONDITIONS

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The purpose of this study was to determine whether age related changes in LV diastolic performance, as assessed by Doppler mitral flow indices, occur independent of hypertension, coronary disease, and differences in LV mass (LVM), heart rate (HR), contractility, preload and afterload. Ten young (age 20-40) and 10 old (age 60-80) normotensive male volunteers with normal screening exercise radionuclide angiograms (RNA) and echocardiographically normal valves underwent right heart catheterization, 2-D echocardiography and RNA for measurement of LVM (gm), HR (bpm), RNA ejection fraction (EF, %), pulmonary wedge pressure (WP, mmHg), mean arterial pressure (MAP, mmHg), and end-systolic wall stress (ESWS, 10^3dynes/cm^2):

	LVM	HR	EF	WP	MAP	ESWS
Young	150±27	69±13	66±3	10±3	93±5	105±29
Old	152±28	66±10	64±8	9±3	91±17	97±58
	p=0.91	p=0.54	p=0.50	p=0.15	p=0.50	p=0.70

Early (E, cm/sec) and late (A) mitral inflow velocities, A/E, and peak filling rate (PFR, ml/sec) were measured by pulsed wave Doppler:

	E	A	A/E	PFR
Young	82±12	43±10	54±15	448±152
Old	56±13	59±14	109±29	274±62
	p=0.0002	p=0.009	p<0.0001	p=0.004

Thus, elderly subjects free of cardiovascular disease and well matched for confounding hemodynamic variables had markedly reduced early diastolic filling and increased late filling. These findings suggest that altered diastolic performance is intrinsic to the aged human LV.